



# NES Cafe Nintendo Emulator for Java

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To learn how to setup NES Cafe quickly on your Web Server or on your PC, please turn to the first chapters of this PDF where there are Quick Start guides for those versions of NES Cafe.

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## Welcome to NES Cafe

Welcome to the NES Cafe Nintendo emulator for Java. If you have a question or wish to give me any feedback on the NES Cafe Nintendo emulator then please do not hesitate to contact me via email (my address is above) as your comments and suggestions are always welcome. More information on NES Cafe can also be found on the NES Cafe website (address also shown above).

### Introduction

Welcome to the NES Cafe Nintendo Emulator for Java. In a nutshell, the NES Cafe emulator allows you to play your old 8-bit Nintendo Entertainment System (NES) games on your computer by emulating the original hardware of the NES and tricking the games into thinking that they are running on the original machine. To play one of your old Nintendo games all what you need is the NES Cafe emulator, a copy of the game in NES format and a Java Virtual Machine installed.

NES Cafe was the first Java-based emulator for the Nintendo with sound support and the only one to offer such a high level of compatibility with the original hardware, by correctly emulating the microprocessors and additional controllers. I started work on NES Cafe in May 2000 for my final year Computer Science project. Since the first release back in 2001, I have been continually working on and improving NES Cafe during my spare time (not that I get a lot of this). NES Cafe is now a stable and powerful emulator that is being run on many websites and can also be run as a standalone application from your desktop. It runs the vast majority of commercial NES games.

Thanks for downloading NES Cafe. I hope that you enjoy it!

David de Niese



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## 1 Quick Start Guide for installing the NES Cafe Applet

This checklist should be completed to install the NES Cafe Applet on your Website:

- 
- 1 Log into (FTP into) your Web-site so that you are able to upload files.
  - 2 Create a new /nescafe/ directory from the root of your Web Site.  
If you are using the Apache Web Server then this directory is usually created inside of the /htdocs/ Apache directory. If you are using Microsoft IIS then you should use the Internet Information Services application, which can be accessed from the Administration Tools section of the Control Panel. Please consult the documentation for your Web Server if you are unsure.
  - 3 Download the NES Cafe Applet version from the NES Cafe website and copy the following files from the distribution ZIP file to the /nescafe/ directory:

- nescafe.html
- nescafe.jar
- nescafe.settings
- nescafeproxy.php

- 
- 4 Create a subdirectory (folder) for your ROM files at /nescafe/roms/. Ensure that you are legally allowed to host whichever ROM game files you host from your site. If you do not have ROM images then you should Google 'NES roms', although you still need to check that you are entitled to host such files.
  - 5 Change the ROMFILE tag inside the nescafe.html Applet Tag to point at the ROM file that you want NES Cafe to load upon start-up. If you have uploaded a ROM game file called mario.zip (which may be mario.nes inside a ZIP file) to the /nescafe/roms directory on your Web Server then you should change the ROMFILE tag to point at roms/mario.zip using the following syntax:

```
<param name=ROMFILE value="roms/mario.zip">
```

- 
- 6 Ensure PHP is installed on your Web Server computer. PHP is freely available on the Internet and is already installed on most Websites. If you use a commercial company to host your website then you should contact them to ask if PHP has already been installed. NES Cafe will work without PHP installed, but your visitors will get an error message when they start it.
  - 7 Use an Internet Browser (such as Fire Fox or Microsoft Internet Explorer) to browse to your website. If your domain is called localhost then you should browse to <http://localhost/nescafe/nescafe.html> to start NES Cafe. You will also have to ensure your visitors have installed Java in order to run it.
  - 8 NES Cafe should start and you should see the NES Cafe logo.
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## 2 Quick Start Guide for installing standard NES Cafe

This checklist should be completed to install the standard version of NES Cafe on your PC:

- 
- ① Download NES Cafe Standalone version from the NES Cafe website and copy the files from the distribution ZIP file to a /nescafe/ directory on your PC.

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  - ② Download a Java Virtual Machine (Plugin) from the java.sun.com website and install it onto your computer. A Java VM is required in order to run NES Cafe.

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  - ③ Go to the directory in which you installed NES Cafe and then:  
  
If using the Windows operating system:  
Double-click the nescafe.bat file to run NES Cafe  
  
If using the Mac OS, Unix or Linux operating systems:  
Run the command `java -jar nescafe.jar`

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  - ④ NES Cafe should start and you should see the NES Cafe logo.
-



### 3 Distributions

The NES Cafe emulator is available in two main distribution packages. NES Cafe is available as a compiled application (Standard Distribution) and as a compiled Applet for your website (Applet Distribution). There are also some additional Special Edition releases of NES Cafe, such as the Punch-Out Special Edition that is available from the NES Cafe website and both the Applet and Application versions are also available without sound (for use on slower computers). The following table lists the different NES Cafe distributions available and what kind of person might be interested in downloading each.

#### 3.1 Standard Distributions

Distribution	Person
Standard	[most people] The majority of people will want this standalone version of the NES Cafe emulator. It contains everything (apart from the Nintendo games) that you will require to get NES Cafe running on your PC.
Applet	[website developers] Anyone wishing to host NES Cafe on their own web-site and allow their visitors to play Nintendo games online will want to download the Applet version of NES Cafe (again, no games are included).

#### 3.2 Special Distributions

Distribution	Person
Standard Mute	[people who have slower computers and want to run NES Cafe] Those that want the Standard version of NES Cafe (above), but whose computers are a little slower may want to download this version instead. This version has the sound processing removed.
Applet Mute	[web site developers, who cater for slower client computers] Those that want to host NES Cafe on their websites may also want to cater for slower client computers. This version is a cut-down version of NES Cafe which has the sound processing removed.
NES Cafe ROM Image and Source	[6502 techie's] This distribution contains the 6502 source code for the NES Cafe ROM image that is distributed with the emulator. People interested in writing NES ROMs in 6502 assembler may find this interesting.



## 4 Requirements for Running NES Cafe

Depending on the version of NES Cafe that you download (Standard or Applet), you will need to meet the following software and hardware requirements to use NES Cafe. You should ensure that these requirements are met prior to installing NES Cafe on your PC.

### 4.1 Standard Distribution

Category	Requirement
Operating System	NES Cafe supports all major Microsoft, Apple Macintosh and Linux Operating Systems.
Java Virtual Machine Runtime	A Java Virtual Machine (JVM) allows you to play Java applications on your computer, the Sun Java Virtual Machine is recommended.  Sun Java Virtual Machine 1.5 (or higher)

### 4.2 Applet Distribution

Category	Requirement
Java Virtual Machine Runtime	Java Virtual Machine is not required on the Web Server because the Applet code is executed on the client-side (remote side).  Therefore, you must ensure that your visitors have a Java Virtual Machine installed prior to being presented the NES Cafe Applet.
HTTP Web Server	The following Web Servers are supported:  Microsoft IIS Web Server 5.0 Apache 1.3.X (or later)
PHP	If you intend to host NES Cafe on your Web Server then it <b>must</b> be PHP-enabled. You can download and install PHP from <a href="http://www.php.net">www.php.net</a>



### 4.3 Downloading Java

A Java Virtual Machine is required to be able to run NES Cafe. You can download Java from the link provided in the following section under the heading *Sun Java Virtual Machine and SDK*. When you click on the link, follow the path to *J2SE (Core/Desktop)* and then download *J2SE 1.X* (or higher). You can download Java at <http://java.sun.com>

### 4.4 Linked Websites

Application	Website
NES Cafe Website	<a href="http://www.daviddn.com/nescafe">http://www.daviddn.com/nescafe</a>
Sun Java Virtual Machine and SDK	<a href="http://java.sun.com">http://java.sun.com</a>

### 4.5 Play NES Cafe Online

If you want to see NES Cafe in action then visit one the following sites shown below. There are many other sites that you can play NES Cafe online from, for a more complete listing please visit the NES Cafe Online Website (above), or do a search in Google.

Website	
NES Cafe Online Website	<a href="http://www.daviddn.com/play">http://www.daviddn.com/play</a>
1980-games	<a href="http://www.1980-games.net">http://www.1980-games.net</a>
Every Video Game	<a href="http://www.everyvideogame.com">http://www.everyvideogame.com</a>
Online Video Game Player	<a href="http://www.onvgp.com">http://www.onvgp.com</a>



## 5 Installing NES Cafe

To learn how to configure NES Cafe on your Web Server or on your PC, please turn to the first chapters of this document where Quick Start guides for those versions are provided.

### 5.1 Installing the Standard Distribution

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- 1 Check the requirements for the Standard Distribution and ensure that they are met.
  - 2 Unzip the distribution files (NES Cafe`xxxbin.zip`) to a directory (folder) on your PC.
  - 3 Microsoft Windows:  
Go to the folder that you uncompressed NES Cafe to and run NES Cafe.bat  
  
UNIX, Linux or Mac OS X:  
Change to the directory that you uncompressed NES Cafe to and type:  

```
java -jar nescafe.jar
```
  - 4 NES Cafe should now be running on your computer.
- 

### 5.2 Installing the Applet Distribution

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- 1 Check the requirements for the Applet Distribution and ensure that they are met.
  - 2 Unzip the distribution files (NES Cafe`xxxapp.zip`) to a directory on your Web Server.
  - 3 Copy the nescafeproxy.php PHP script to the *same* directory that you copied the nescafe.jar file to. This PHP script is required to allow NES Cafe to access the NES Cafe website. If you receive the error that NES Cafe could not authorise then you have either not copied this file to that directory or you have not installed PHP.
  - 3 Navigate your Browser to the URL corresponding to where you installed NES Cafe. For example, if you are running Microsoft IIS Web Server and you unzipped NES Cafe to C:\inetpub\wwwroot\nescafe on your local machine then you should navigate to `http://localhost/nescfe/nescfe.html` to run the NES Cafe emulator.
  - 4 You should now see NES Cafe running from your Web Server with the default NES ROM. Please see the Applet Configuration section on how to configure the settings.
  - 5 If you are using a Web Server such as Apache or IIS, then you may also install PHP and the optional PHP scripts that come with NES Cafe. These scripts allow visitors to use the Save and Load State features, the Save and Load RAM features and the Screen Shot feature in the Applet version. Information on configuring these is available in the Applet Configuration section of this document and in section 8.1.
-



### 5.3 Using NES Cafe

Whether using the Standard or the Applet version of NES Cafe, the interface is very similar. The only difference is that the Standard version has a File Menu available, whereas the Applet version does not. In both versions, the majority of the functionality is available via the NES Cafe Menu, which can be accessed by pressing the ESC key.

Also, various menu items may be disabled depending on the current state of the emulator (for example, some options will not be available if a game isn't running), and depending on the distribution that you are using (the Sound options are not available in Mute versions and the Online options are not currently available in the Applet versions).



Main NES Cafe Screen

#### Getting Started

When you run either the standard version of NES Cafe (from the Standard Distribution) or the Applet version (from the Applet Distribution) it will start by automatically loading the NES Cafe ROM file. If you are using the Standard version, you can load and close the games by selecting the relevant options from the File Menu.

Click on the Load Rom menu item on the File Menu and a File Open dialogue box will be displayed, allowing you to select the ROM (Nintendo Game) that you want to load. The game will then start running in the main window.



The NES Cafe Main Menu (press ESC to access)

The NES Cafe Menu provides most of the game functionality. This can be assessed by either pressing the ESC key, by selecting the NES Cafe Menu from the File menu in the Standard version or by right-clicking the main display screen.

The Settings Menu allows you to configure the keyboard controls, enable or disable the Light Gun, enable or disable the Sound (if not using the Mute version) and configure the graphics.

The Emulation Menu allows you to save or load the State of the Emulator, pause or reset the Nintendo game you are playing. On games where Save RAM is enabled, there is also the additional option of Wiping the Save RAM.

The Extras Menu allows you to use the built-in Debugging Engine (6502 Disassembler), to enter Game Genie codes, record movies and grab screenshots. If you are playing a game that supports NES Cafe Subtitles (see later) then the option to toggle these is also found here.



The NES Cafe Online Menu allows you to configure your proxy settings (if you require one to connect to the Web) and to download games directly a NES Cafe Game Server. Please note that if you are using the Applet distribution of NES Cafe then you will not have the security permissions to access the NES Cafe ROM Server from some websites.



NES Cafe Settings Menu Screen

### The Settings Menu

You can configure your own controls for the NES Cafe Joy Pad from the Settings menu. You can also change the Graphics options, including enabling screen smoothing to reduce the jagged edges on the Nintendo's display when you play NES Cafe with an enlarged or scaled screen.

There are also options to configure the Time Shift Buffer settings from this menu, which saves the state of the emulator every couple of seconds so if you make a mistake then you can press the BACKSPACE key to jump back in time and correct it – almost like your own Warp Zone!

Finally, you can configure the format of the Movie Files that are produced when you press F8. You can choose whether you wish to save only the key-presses (resulting in small movies), or whether you wish to record a full animated GIF.

### The Emulation Menu

You can use the Emulation menu to save the state of NES Cafe and then load it back into memory again at a later stage. For example, if you are just about to battle Bowser and you are not feeling too confident then you could hit Save State (keyboard key C) before approaching him. Then, if you were to die, just click on Load State from the Emulation menu (keyboard key L) and you will be back where you were before dying.



NES Cafe Load State Menu Screen

The Save State Screen of the Emulation menu is shown on the left. You can Save a State into one of the available slots for each game. When you go to Load a previously saved state you can cycle through the available slots by pressing the UP and DOWN arrows on your keyboard. As you highlight a slot, a thumbnail image at the point at which you saved the state of the emulator will be displayed in the top corner of the screen.

Each Save Slot can be used to either store State files (taken when pressing C for Commit), or Movie files (taken after recording a movie by pressing F8). If a Slot also contains a Movie then the words "Movie Embedded" will be displayed.



## The Extras Menu

The Extras Menu provides access to the NES Cafe Debugging Engine, the Time Shift Buffer and a host of other extra features – such as the ability to input Game Genie Codes, record movies and save screenshots. These options are explained below.

- NES Cafe supports Game Genie codes. Click on Enter Game Genie Code (or press G whilst playing) and then supply a code for the game that you are playing. There are hundreds of Game Genie codes for Nintendo games available on the Internet.
- The Time Shift Buffer (Warp Zone) allows you to jump back in time, much like when using the Time Shift Buffer on a modern video machine. The game state is automatically recorded every couple of seconds (defined from the Settings Menu); therefore if your game isn't going too well you can use this option to jump back.
- NES Cafe also includes a 6502 Debugging Engine. This allows you to see what is going on inside the NES game that you are playing – but be warned, you will require a good working knowledge of 6502 Assembler. You can start the Debugger by pressing F5. The Registers are shown in the top right hand corner in Binary and Hexadecimal. The actual code being executed is shown in the bottom window.
- Game Subtitles are unique to NES Cafe, but are currently only available for a couple of games. NES Cafe emulates the game, and on certain supported games it can also provide additional information. For example, in Punch-out the subtitles show the actual amount of energy in each fighter's energy bar, as well as the strength of the punches, perfect for determining which punch is the best one to use and when!
- Finally, the ability to disable Overrides is also provided. Overrides are unique to NES Cafe. Overrides allow Websites or users to change the behaviour of games to a greater extent than possible with just Game Genie codes. They support decision logic on the basis of memory reads and writes within the game, which therefore supports broadcasting of score data. You can read more about Overrides later.



NES Cafe Online Menu Screen

## The NES Cafe Online Menu

The NES Cafe Online Menu allows you to configure your connection to the Internet and to download Games from a NES Cafe Games Server.

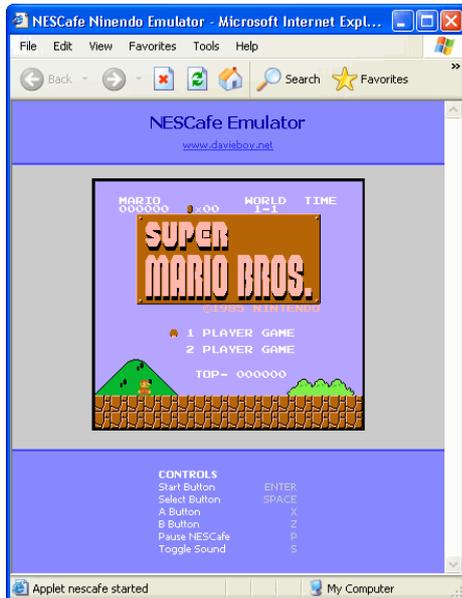
### Important Note:

You should never attempt to download a NES ROM game that you do not own the original cartridge for. Doing so is software piracy, which is strictly against the law in most counties. The author of NES Cafe cannot and will not be held responsible for how you use this emulator, especially if you intend to pirate NES games.



## 6 NES Cafe Applet Configuration

### 6.1 Applet Distribution



The NES Cafe Applet version runs from within a Web Browser. The look and feel of the NES Cafe interface is provided by the NES Cafe.html file (the actual NES Cafe Java Applet only presents the game window). If you intend hosting NES Cafe on your site then feel free to change the page to your suiting, however it would be appreciated if you would place a link back to the NES Cafe website and donate to the development.

To run NES Cafe from your website on a Web Server you need to ensure that the Web Server has PHP installed to support the nescafeproxy.php script that allows the Applet to communicate with the NES Cafe Server. If you do not install this proxy script or do not install PHP then NES Cafe will complain that it couldn't authenticate when it attempts to start up on your Web Site.

### 6.2 Checklist for installing NES Cafe on your Website:

1. Ensure a Web Server and PHP are installed and correctly configured.
2. Copy the following files to a directory that is hosted on your Web Server:
  - NES Cafe.html (this is the main HTML file with the Applet Tag)
  - nescafe.jar (this is the NES Cafe emulator executable code bundle)
  - nescafeproxy.php (this is the PHP proxy script required for NES Cafe)
  - nescafe.settings (this is the settings file that holds the configuration for NES Cafe)
3. Optionally, if you want the extra functionality NES Cafe provides for allowing your users to save and load states and images then copy the following PHP files and enable them in the Applet Tag (see details below, and in section 8.1):
  - nescafe-load.php (used to load NES Cafe data files, if enabled in Applet Tag)
  - nescafe-save.php (used to save NES Cafe data files, if enabled in Applet Tag)
  - nescafe-showthumb.php (used by view Thumbnail images from State/RAM files)
4. Finally, go to the HTTP location that you uploaded NES Cafe to and run it. If you installed the application successfully then you should see the NES Cafe logo. It is worth remembering that you will need your clients to install a Java VM as well.

There are loads of examples of other people that are running NES Cafe on their own sites, just do a search for NES Cafe in Google, or visit the Play section of the NES Cafe website to find some successfully configured installations.



### 6.3 The NES Cafe Applet Code Tag

The core settings for the NES Cafe Applet are contained within the NES Cafe.html file. There are two ways that you can specify NES Cafe to run from within an HTML page. The first approach is to use the Applet Tag and the second is to use the OBJECT tag.

#### Using the APPLET Tag

This is the easiest and, usually, the most common way of running an Applet from a web page. However, it can cause compatibility issues with older versions of Java. The code below shows the structure of the Applet tag and the possible settings that are supported.

```
<applet code=NESCafeApplet archive="nescafe.jar" width=256 height=240>

    <param name=ROMFILE           value="roms/nintendogame.nes">
    <param name=LIGHTGUN          value="false">
    <param name=SOUND              value="true">
    <param name=SETTINGSFILE      value="mysettings.settings">
    <param name=GAMEGENIE         value="ITYEOXUK, APZLGI">
    <param name=LOADSTATEONSTARTUP value="savestates/mystate.nss">
    <param name=IPSURL            value="ips/patchfile.ips">

    <param name=LOADDATAURL      value="scripts/nescafeload.php">
    <param name=SAVEDATAURL      value="scripts/nescafesave.php">

</applet>
```

#### Using the OBJECT Tag

This is the preferred approach for running the NES Cafe Applet from within a web page. It ensures that the user has Java installed correctly and that the version is relatively recent. The following code shows the structure of the Object tag and the possible settings that the tag supports. More detail on the individual settings is in the next section.

```
<object classid="clsid:8AD9C840-044E-11D1-B3E9-00805F499D93"
width=265 height=250
codebase="http://java.sun.com/products/plugin/1.3/jinstall-13-win32.cab#Version=1,3,0,0"
id="nescafe">

    <param name="CODE"           value="NESCafeApplet">
    <param name="name"           value="nescafe">
    <param name="ARCHIVE"        value="nescafe.jar">
    <param name="codebase"       value=".">
    <param name="type"           value="application/x-java-applet;version=1.3">

    <param name="ROMFILE"       value="roms/nintendogame.nes">
    <param name="LIGHTGUN"      value="false">
    <param name="SOUND"          value="true">
    <param name="SETTINGSFILE"   value="nescafe.settings">
    <param name="GAMEGENIE"     value="ITYEOXUK, APZLGI">
    <param name="LOADSTATEONSTARTUP" value="savestates/mystate.nss">
    <param name="IPSURL"        value="ips/patchfile.ips">
    <param name="LOADDATAURL"   value="scripts/nescafeload.php">
    <param name="SAVEDATAURL"   value="scripts/nescafesave.php">

</object>
```

Please note however that the Object Tag approach only works with Microsoft Internet Explorer. Most sites use a combination of both to ensure maximum browser compatibility.



## 6.4 Parameter Settings Explained

In general, the settings that you can configure in the Applet or Object Tag for NES Cafe are specific for the current game that you are playing, they include whether Game Genie codes are enabled, the name of the ROM file to load, whether to use the Light Gun, etc. There are additional settings that can be made in the NES Cafe settings files. These are more general settings on how NES Cafe performs and functions on your website.

Tag	Meaning	Optional	Default
WIDTH	<p>The width in pixels of the displayed Applet.</p> <p>This setting should be at least 256 to ensure that the entire Nintendo screen is visible. It should be noted that when both the width and height are increased beyond 300 pixels then the NES Cafe screen will be magnified and centred.</p> <p>For those who want to display NES Cafe in exactly double resolution then a value greater than 512 should be used in this setting.</p>	No	256+
HEIGHT	<p>The height in pixels of the displayed Applet.</p> <p>This setting should be at least 240 to ensure that the entire Nintendo screen is visible. It should be noted that when both the width and height are increased beyond 300 pixels then the NES Cafe screen will be magnified and centred.</p> <p>For those who want to display NES Cafe in exactly double resolution then a value greater than 480 should be used in this setting.</p>	No	240+
ROMFILE	<p>The location of the Nintendo ROM files to play.</p> <p>When the NES Cafe Applet starts up it will attempt to load and run the ROM file that is specified by this tag. If no Nintendo ROM file is provided then the default nescafe.nes file will be loaded instead (from inside the JAR file).</p>	Yes	nescafe.nes
LIGHTGUN	<p>Whether or not the Light Gun is enabled.</p> <p>This tag should be set to True for all the games that require Light Gun (Zapper) support (for example, games such as Duck Hunt).</p>	Yes	False
SOUND	<p>Whether or not Sound should be emulated.</p> <p>This tag should be set to True for all games that you want NES Cafe to emulate the sound for.</p>	Yes	False



Tag	Meaning	Optional	Default
SETTINGS FILE	Specifies an alternative filename to read the Settings file from. If this tag is not provided the settings file will be attempted to be read from the same directory as the NES Cafe Applet and will be expected to be called <i>nescafe.settings</i>	Yes	[None]
GAMEGENIE	Specifies the Game Genie Codes to load at start-up for the current Applet Game. Up to four valid Game Genie Codes can be provided, with commas between the codes. For example: "ITYEOXUK, APZLGI"	Yes	[None]
LOADDATA URL	References the NES Cafe Load PHP Script This tag points at the NES Cafe Load PHP script, or to a custom CGI script that can handle requests for NES Cafe State or Save RAM files. If this Tag is not provided then the user cannot load any NES Cafe data files into the emulator. The NES Cafe Load PHP script is documented and is included with the Applet distribution (other language ports are also available). More information on this script can be found in the Example PHP Scripts section of this document and in section 8.1 of this document.	Yes	[None]
SAVEDATA URL	References the NES Cafe Save PHP Script This tag points at the NES Cafe Save PHP script, or to a custom CGI script that can handle requests to save NES Cafe State, Save RAM, Screenshot and Movie files. If this Tag is not provided then the user cannot save any data back to the server. Information on configuring this can be found in section 8.1	Yes	[None]
LOADSTATE ONSTARTUP	Points to a NSS file to Load at Reset or Start-up If this value is set to the URL of a NES Cafe Save State (NSS) file then the State referenced by this tag will be loaded when NES Cafe starts.	Yes	[None]
IPSURL	An IPS File to patch the current ROM with. International Patching System files are used to change the game code. Many IPS files exist on the Internet for Nintendo games. If you want to use an IPS file with NES Cafe in Applet mode you can specify it using this IPSURL tag.	Yes	[None]



## 6.5 NES Cafe Settings File

The NES Cafe Settings file can be used to store general environment settings and custom options for the NES Cafe emulator, over and above those from the applet tag. The NES Cafe settings file should be placed in the same directory as the main JAR file.

Proxy Section	Description
UseProxy [Standard mode only]	If using a Proxy Server to connect to Internet
ProxyServer [Standard mode only]	The name of the Proxy Server
ProxyServerPort [Standard mode only]	The Proxy Server Port
ProxyServerUsername [Standard mode only]	The Proxy Server Username
ProxyServerPassword [Standard mode only]	The Proxy Server Password

TimeShiftBuffer Section	Description
TimeshiftBufferLength	The length in units of the Time Shift Buffer.
TimeshiftBufferInterval	The number of seconds between each unit in the TSB. If this value is 2 and the length of the Time Shift Buffer (defined by TimeshiftBufferLength) is 30 then a State will be saved automatically each 2 seconds and the user will be able to jump back at most 60 seconds (2 times 30).

Graphics Section	Description
ImageSmoothing	If Image Filtering is used (fast CPU required). This improves the quality of the NES Cafe screen image by smoothing the graphics, but the emulation speed is slowed down in return. If you have a fast PC and run NES Cafe at high resolutions then you could use this.
ScreenSizeFactor	The factor to force the screen to draw at Valid values range from 1 to 3. This is the factor (amount of magnification) applied to the screen, independent of how the screen is sized in terms of width and height.
HighResThumbnails	Thumbnails are taken at higher resolution. This increases the size of Save State and Save RAM files, but the thumbnail images are stored at higher resolution.
MovieMaxSize	Maximum size in bytes of an Animated GIF Movie. Set this value to the maximum size of Animated GIFs that you want NES Cafe to create. This will allow webmasters to control the amount of data these file occupy. Setting this value less than 1K will disable Animated Gif support.
MovieMode	The Allowed Movie Recording Formats This value specifies what recording formats are allowed for users to record their movies. Setting this value to ANY will allow both Animated GIFs and Keystroke movies to be recorded. Setting this value to FORCE_ANIMATED_GIF or FORCE_KEYSTROKES will force either Animated GIF or Keystroke movie recordings respectively. This is useful if you want your site to only accept a particular movie type.
MovieFormat	The default Movie recording type Set this value to KEYSTROKES or ANIM_GIF to set the



Graphics Section	Description
	default recording type to either Keystroke or Animated GIF movies respectively. This can be used in conjunction with the above setting to force a movie recording type.
ImageFormat	Configures the default Image saving format Set to either PNG or GIF and determines the image format of all screen capture files. If this value is not provided then the default image format is PNG.
ClipBorders	Whether the left and right screen borders are clipped Set this value to TRUE to prevent the left and right-most 8 pixels of the screen from being drawn, just like the original Nintendo did on most television sets.

When specifying the controls, you can either use reserved keywords (such as ENTER, SPACE, SHIFT, CTRL or PGUP), the actual key value (such as A, B, C or Z) or the actual ASCII value (such as 65 for A, 66 for B or so on). Only the Joypad buttons (A, B, Start and Select) can be reassigned, the directions cannot currently be reassigned.

Controls Section	Description
Joypad_A	The key to use for Joy Pad 1's A button.
Joypad_B	The key to use for Joy Pad 1's B button.
Joypad_Start	The key to use for Joy Pad 1's Start button.
Joypad_Select	The key to use for Joy Pad 1's Select button.
Joypad_Up	The key to use for Joy Pad 1's Up button.
Joypad_Down	The key to use for Joy Pad 1's Down button.
Joypad_Left	The key to use for Joy Pad 1's Left button.
Joypad_Right	The key to use for Joy Pad 1's Right button.

StartUp Section	Description
StartDownloader	Whether the Download screen should appear on start-up. If you set this value to TRUE then the NES Cafe download screen will appear automatically when NES Cafe starts. This screen allows NES Cafe to talk with the NES Cafe Online site to select and download NES ROMS.



StartUp Section	Description
StartTimeTrial	<p>Whether Time Trial Mode should run on start-up.</p> <p>If you set this value to TRUE then NES Cafe will go into Time Trial mode. When NES Cafe starts it will display a message to the user saying that they have entered Time Trial mode, at any time the user can then hit the T key to submit their current score back to the website (provided the website can support Time Trial data from the nescafesave.php script interface). The Time Trial score data is sent back to the Web Server with a screenshot that can validate the authenticity of the score submitted.</p> <p>Setting this value to TRUE also sets the values below in order to prevent users cheating during Time Trial mode.</p> <pre> disableDebugging = true; disableMenu = true; disableROMDownload = true; disableFrameSkip = true; disableTimeShiftBuffer = true; disableGameGenieChanges= true; startDownloader = false; </pre>
StartActivityMonitor	<p>Whether the Activity Monitor should run on start-up.</p> <p>Setting this value to true will start the Activity Monitor when NES Cafe start-ups. The user will not be able to close it down, or play any games. This will allow a website owner to allow his visitors to view the games that are being played on NES Cafe and to allow their visitors to jump to any site that was recently used to play a game.</p>
OverRideFile	<p>The File containing the NES Cafe Override script.</p> <p>NES Cafe Overrides are a unique feature to NES Cafe, they allow decision logic to be coded against reads and writes within the video game. This allows you to have greater control over the game than you would with just a Game Genie code. For example, Overrides (specified using the NES Cafe Override scripting language) could be programmed to broadcast your score from the memory address that it is stored in within the game upon completion of a level in Mario. Please read the section on NES Cafe Overrides in this document for more details.</p>
OverRideActiveAtStartup	<p>Whether the Overrides specified should be active at boot.</p> <p>By default all Overrides are automatically enabled at Start-up. Set this value to FALSE to prevent the Overrides that are specified by the above OverRideFile tag from being enabled automatically when NES Cafe starts up.</p>

Security Section	Description
DisableDebug	Specifies whether the Debug Engine is disabled. Setting this to TRUE will also disable the Code Profiler.
DisableDownloading	Specifies whether the ROM Download screen is disabled. Currently this option is only supported from the NES Cafe Online website, but could be rolled out in future releases.
DisableFrameSkip	Whether the auto-frame skip should be disabled. This may result in slower frame rates (because every frame will be rendered), but will produce less juggy game-play on slower PCs, or less performing Java Virtual Machines.



Security Section	Description
DisableSaveRAM	Whether the user is allowed to Save RAM. This setting requires the SAVERAMURL tag to also be set. Otherwise it will not be active (even if this is set to FALSE). This states whether the user is allowed to use the Save RAM feature. This is a useful override for those that wish to enable the SAVERAMURL for a particular saving feature, but do not want to enable all features.
DisableSaveState	Whether the user is allowed to Save States. This setting requires the SAVERAMURL tag to also be set. Otherwise it will not be active (even if this is set to FALSE). This states whether the user is allowed to use the Save State feature. This is a useful override for those that wish to enable the SAVERAMURL for a particular saving feature, but do not want to enable all features.
DisableSaveImage	Whether the user is allowed to Save Images. This setting requires the SAVERAMURL tag to also be set. Otherwise it will not be active (even if this is set to FALSE). This states whether the user can use the Save Screenshot feature. This is a useful override for those that wish to enable the SAVERAMURL for a particular saving feature, but do not want to enable all features.
DisableSaveMovie	Whether user is allowed to Save Movies. This specifies whether the user is allowed to use the Save Animated GIF Movie feature (it does not apply to standard key-press movies). This is a useful override for those that wish to enable the SAVERAMURL for particular features, but do not want to enable all features.
DisableTimeShiftBuffer	Whether the user is allowed to use the Time Shift Buffer. This setting can be used to prevent users from using the Time Shift Buffer feature within NES Cafe. This is automatically set when in Time Trial mode, but can be set individually to prevent users from cheating in games.
DisableOverrideChanges	Whether the user can disable the current Overrides. This setting can be used to prevent users from changing or disabling the NES Cafe Override settings that were defined by the hosting website. To learn about Overrides please view the Override section within this document.
DisableGameGenieChanges	Whether the user can CHANGE Game Genie Settings. This setting can be used to prevent changes to the Game Genie settings. This means that whatever Game Genie codes were loaded at start-up (either none, or a particular code or groups of codes) will remain active.
DisableMenu	Whether the NES Cafe menu is disabled. This setting can be used to prevent the user from going into the NES Cafe menu system to change settings.
DisableReset	Whether the user can reset the current game. This setting can be used to prevent the user from resetting games in NES Cafe. If this value is set to true then the user will not be able to reset their game.
DisableActivityMonitor	Whether the Activity Monitor is disabled. This setting can be used to prevent the user from accessing the Activity Monitor within NES Cafe. If this value is set to true then the user will not have access.



## 6.6 PHP Code Scripts

As mentioned above, a series of PHP (Hypertext Pre-processor) scripts are included with the Applet distribution. The PHP scripts can be used by a PHP-enabled Web Server to increase the functionality of NES Cafe further. Each script is heavily commented and the role of each script is explained below. These scripts should be customised before being deployed to your own web server and could be easily ported to other CGI languages.

Example Script Name	Description
nescafeproxy.php [MANDATORY]	<p><b>Overview:</b></p> <p>The script is a Proxy that allows the NES Cafe Applet, which is hosted on your Web Site, to communicate back with the NES Cafe server back at <a href="http://www.daviddn.com">www.daviddn.com</a>. This script <b>MUST</b> be copied to the same directory that you have copied the NES Cafe JAR file to (<code>nescafe.jar</code>), otherwise NES Cafe will fail to start up.</p>
nescafesave.php	<p><b>Overview:</b></p> <p>NES Cafe posts the following data to this script when the user wants to save a State, SaveRAM, Movie or Screen shot data file (additional options may be appended to the URL required):</p> <p>contenttype : the type of NES Cafe data being transmitted            gamename : The name of the NES game running            saveslot : The Save Slot number (for Save States)</p> <p>The script receives a Saved State, Save RAM, Screenshot or Animated GIF file from NES Cafe (depending on the value of Content Type) stores the data file to the Server. The script is referenced from the Applet Tag using the <code>SAVEDATAURL</code> Tag:</p> <pre>&lt;param name= SAVEDATAURL value= "nescafesave.php?user=UserName"&gt;</pre>
showthumb.php	<p><b>Overview:</b></p> <p>This script can be run against a NES Cafe Saved State or Save RAM file on the Server to return the thumbnail image from inside the file as a GIF or PNG image file. You can call this script from your browser by passing the filename as <i>file</i>.</p> <p><a href="http://domain/showthumb.php?file=savestatefile.nss">http://domain/showthumb.php?file=savestatefile.nss</a>  <a href="http://domain/showthumb.php?file=saveramfile.sav">http://domain/showthumb.php?file=saveramfile.sav</a></p> <p>Please note that this script does not run from the Applet Tag.</p>



Example Script Name	Description
nescafe/load.php	<p><b>Overview:</b></p> <p>NES Cafe posts the following data to this script when the user wants to load either a NES Cafe State or SaveRAM data file (additional options may be appended to the URL if required):</p> <p>contenttype : nescafe/state   nescafe/saveram gamename : The name of the NES game running ext : nss (for Save States)   sav (for Save RAM) saveslot : The Save Slot number (for Save States)</p> <p>The script fetches either a Saved State or Save RAM file (depending on the value of ContentType) from the Web Server and presents it back to NES Cafe. The script is referenced from the Applet Tag using the LOADDATAURL Tag setting:</p> <pre>&lt;param name= LOADDATAURL value= "nescafe/load.php?user=UserName"&gt;</pre> <p>The files are read from the following locations on the Server:</p> <pre>states/username-gamename.nss saveram/username-gamename.sav</pre> <p>If no user value is provided, or NES Cafe cannot determine the name of the game being played then <i>unknown</i> is used instead.</p> <p><b>Important Note Regarding Save RAM:</b></p> <p>When loading Save RAM files, if no Save Ram is available on the server for the specified user/game, then it is <i>very</i> important that this script returns the phase "NOSAVRAM" (as per the example script included with the NES Cafe Applet distribution).</p> <p>This response informs NES Cafe that there wasn't a communication error and, if as a result of playing the game some SaveRAM content gets generated, it would be alright for NES Cafe to attempt to save it back to the server.</p> <p>If the phase "NOSAVRAM" does <i>not</i> get returned by this script then NES Cafe assumes that a communications error occurred and does not attempt to save any generated SaveRAM back to the server in-case the saving process overwrites the server-side SaveRAM that was intermittently unavailable during the load.</p>



## 6.7 NES Cafe API for JavaScript

NES Cafe exposes an API (Application Programmers Interface) that will allow JavaScript in the surrounding webpage to control certain aspects of the emulator whilst it is running. This section of the document provides some examples of what can be done.

Function	Description and Example
loadROM(URL)	<p>This function can be used to load a different ROM at any time whilst a game is playing in the NES Cafe emulator. For example, you can use the following JavaScript code in your webpage to stop the current NES Cafe game and load a game called Zelda.</p> <pre>&lt;SCRIPT language="JavaScript"&gt;     function loadROM()     {         var nescafe = document.getElementById('nescafe');         nescafe.loadROM('roms/□elda.nes');     } &lt;/SCRIPT&gt; &lt;INPUT     type="button" name="Button1" value="Load Zelda"     onClick="loadROM()" language="JavaScript" &gt;</pre> <p>Please note that for this to work in Firefox, you need to ensure that the APPLET/OBJECT tag that NES Cafe is running inside has both a NAME and an ID field with the value of 'nescafe'</p>
loadState(URL)	<p>This function can be used to load a Saved State at any time whilst a game is playing in the NES Cafe emulator. You can use the following JavaScript code to load a saved State file.</p> <pre>&lt;SCRIPT language="JavaScript"&gt;     function loadState()     {         var nescafe = document.getElementById('nescafe');         nescafe.loadState('savestates/□elda.nss');     } &lt;/SCRIPT&gt;</pre> <p>Please note that for this to work in Firefox, you need to ensure that the APPLET/OBJECT tag that NES Cafe is running inside has both a NAME and an ID field with the value of 'nescafe'</p>



Function	Description and Example
stop()	<p>This function can be used to stop the NES Cafe emulator from running at any time whilst a game is being played. You can use the following example JavaScript code to achieve this:</p> <pre>function stopNES Cafe () {     var nes cafe = document.getElementById('nes cafe');     nes cafe.stop(); }</pre>
canAppletLoadState()	<p>This JavaScript function will return TRUE if the NES Cafe emulator that is running from the webpage is capable of loading Saved State files from your web server:</p> <pre>function queryNES Cafe () {     var nes cafe = document.getElementById('nes cafe');     alert('Load State: ' + nes cafe.canAppletLoadState()); }</pre>
canAppletSaveState()	<p>This JavaScript function will return TRUE if the NES Cafe emulator that is running from the webpage is capable of saving Saved State files to your web server (only the lines of code that are different from above are shown in this example):</p> <pre>var nes cafe = document.getElementById('nes cafe'); alert('Save State: ' + nes cafe.canAppletSaveState());</pre>
canAppletLoadRAM()	<p>This JavaScript function will return TRUE if the NES Cafe emulator that is running from the webpage is capable of loading Save RAM files from your web server (only the lines of code that are different from above are shown in this example):</p> <pre>var nes cafe = document.getElementById('nes cafe'); alert('Load RAM: ' + nes cafe.canAppletLoadRAM());</pre>
canAppletSaveRAM()	<p>This JavaScript function will return TRUE if the NES Cafe emulator that is running from the webpage is capable of saving Save RAM files to your web server (only the lines of code that are different from above are shown in this example):</p> <pre>var nes cafe = document.getElementById('nes cafe'); alert('Save RAM: ' + nes cafe.canAppletSaveRAM());</pre>



## 7 Controls for NES Cafe

The following tables show the keys that can be used whilst NES games are running in the Standard and Applet versions of NES Cafe. The Applet user interface alludes to most of the available key controls, but there are a couple of additional keys also available.

### Controls for Joy Pad 1 (default)

Nintendo Function	NES Cafe Standalone	NES Cafe Applet
Start button	Enter	Enter
Select button	Spacebar	Spacebar
A button	X	X
B button	Z	Z
Up button	Up arrow	Up arrow
Down button	Down arrow	Down arrow
Left button	Left arrow	Left arrow
Right button	Right arrow	Right arrow

**Note that the above controls can be changed**

### Controls for Joy Pad 2 (requires Light Gun to be Enabled)

Nintendo Function	NES Cafe Standalone	NES Cafe Applet
Aim Light Gun (Zapper)	Move mouse	Move mouse
Fire Light Gun (Zapper)	Click Left Mouse Button	Click Left Mouse Button

### Emulation Controls

Nintendo Function	NES Cafe Standalone	NES Cafe Applet
Pause Emulation	P	P
Reset the Game	R	R
Clear Save RAM and Reset	Q	Q
Show Time Shift Buffer	BACKSPACE	BACKSPACE
Commit State of Emulator	C	C (requires SAVEDATAURL tag)
Rollback to Saved State	L	L (requires LOADDATAURL tag)
Display ROM Information	I	I
View Activity Monitor	[not available]	F1
Start / Stop Recording	F8	F8 (requires SAVEDATAURL tag)
Display Sprite Tiles used	F9	F9
Decrease Emulation Speed	F11	F11
Increase Emulation Speed	F12	F12



### Adjustment Controls

Nintendo Function	NES Cafe Standalone	NES Cafe Applet
Display Main Menu	ESC or Right-Click	ESC or Right-Click
Sound Toggle	S	S (must be enabled in tag)
Toggle Game Subtitles*	#	#
Save Screenshot	A	A
Control Player 1	<	<
Control Player 2	>	>
Enter Game Genie Codes	G	G
Time Trial or Override	T	T

### NES Cafe Debug Engine Controls

Nintendo Function	NES Cafe Standalone	NES Cafe Applet
Toggle Debug Mode	F5	F5
Step by Instruction	DOWN (in debug mode)	DOWN (in debug mode)
Step by 5 Instructions	ENTER (in debug mode)	ENTER (in debug mode)
Step to next Event	PGDN (in debug mode)	PGDN (in debug mode)
Start NES Cafe Profiler	F6	[not supported]

---

\* NES Cafe Game subtitles are an information layer that can be displayed over the game. They are currently available when NES Cafe runs Mike Tyson's or Mr. Dream's Punch-out to tell the player the strength of their punches. More details on Subtitles can be found in the following section.



## 8 Special Features and Add-ons

This section of the document outlines additional add-ons and special features that NES Cafe can provide. If you simply want to run a game in NES Cafe or want to host NES Cafe on your website for your visitors then you do not need to read this section. However, if you want to learn about some of the additional capabilities then read on.

### 8.1 Applet Save States

The Applet is able to save state information for the game by posting it back to the website. Then, scripts on your web server (the `nescafesave.php` and `nescafeload.php` scripts that are provided with the Applet distribution) then pick up these requests and store the state data to, or load the state data from, your web server. For this to work you need to ensure that you have done the following actions:

1. Enabled PHP on your web server (the machine you are hosting the NES Cafe Applet from). If you are using a web hosting company then most will have PHP enabled by default, but you should check with them to ensure they have. If you are hosting your web site from your own server then you need to ensure PHP is installed.
2. You need to include the `SAVEDATAURL` and `LOADDATAURL` tags to the Applet and ensure that these point at the `nescafesave.php` and `nescafeload.php` scripts respectively. An example is shown below. If you do not provide these (if you leave them blank) then NES Cafe will state that this feature is disabled. However, if you incorrectly specify the PHP scripts (type the wrong URL) you will be displayed an error when you attempt to save or load states using NES Cafe.
3. Some hosting companies do not allow scripts to store data on the web server (such as Windows hosting with GoDaddy). Unfortunately this will prevent the scripts from running (because they need to store the state information to disk). Please check with your web hosting company (if you are using one) that they don't have this restriction in place. If they did then you should find a less restrictive web hosting company.

An example Applet Tag is below, with the `nescafesave` and `nescafeload` scripts specified:

```
<applet code=NES CafeApplet
  archive=nescafe.jar
  codebase=.
  Width=260
  height=244
  name=nescafe>

  <param name=ROMFILE      value=roms/mario.zip>

  <param name=SAVEDATAURL  value=scripts/nescafesave.php>
  <param name=LOADDATAURL  value=scripts/nescafeload.php>

</applet>
```



## 8.2 NES Cafe Game Subtitles

This feature is unique to NES Cafe. Subtitles provide the player with additional information about what is happening in a game and overlays this on the screen during the game-play. For example, in Mike Tyson's Punch-out, when Subtitles are displayed you can see exactly how hard a punch was, or exactly how much energy you have left in your energy bar. You can display Subtitles for supported games by pressing the # key.

The following games currently support Subtitles (more to come):

Game Name	Features
Punch-Out (Mr Dream and Mike Tyson's)	Displays the exact energy levels for the health bars Displays the exact strength of all the opponents punches Displays the exact strength of all Little Macs punches

## 8.3 ROM Download Client

NES Cafe allows you to download ROMs directly from the NES Cafe Website. However you should only download Nintendo games that you legally own the original cartridge for as otherwise you are breaking the law in most countries. The author of NES Cafe (David de Niese) accepts no liability or responsibility from your use of this feature of the emulator or from you downloading a Nintendo ROM that you are not legally entitled to download.

## 8.4 Time Shift Buffer

The Time Shift Buffer (TSB) can be accessed by pressing BACKSPACE and allows the user to jump back in-time when playing a NES game. Every couple of seconds NES Cafe will automatically record the state of the emulator (configured from the Settings Menu) and maintain a rolling period of states that you can jump back to. The left screen shows the sliding timeline bar that can be used to jump back to a particular point in time.



## 8.5 Recording and Playing Back your Games



Configuring the Recording Format for Movies

NES Cafe supports the ability to record your Games and then play them back at a later stage, potentially on a different PC. Two different Recording Formats are available.

You can choose to save just the initial State of the emulator and then all subsequent key-presses (known as Recording Key-presses). This option is ideal for creating small movie files, provided the person viewing the movie has a copy of NES Cafe and the same NES file.

Alternatively you can save your play to an Animated GIF, which are considerably larger (thus restricted in the Applet version to 2MB), but could be viewed in any Web Browser.



Recording a Game

Load your Game and then to start recording it press F8 on your keyboard (or select Record Movie from the Extras menu). If you are using the Applet version, Game Recording requires a SAVEDATAURL Tag to be defined in your Applet Tag. As the game is being recorded, a flashing red record message is displayed in the top left-hand corner of the screen. When you have finished recording your game, press either the F8 or ESC key on your keyboard.

If you elected to Record Keystrokes, you are then able to save your movie into an available Save Slot. If you elected to Record an Animated GIF, your movie is automatically saved back to your server as a GIF file.

### Playing Back Movies

To play back Keystroke movies press the L key to bring up the Load State menu. Then go to the Save slot that the movie was saved in and you should see a snapshot of the beginning of the movie. You will also notice that the words Movie Embedded appear over the snapshot image to let you know that the State file is a movie. Press ENTER to start the movie and press ESC (at any time during playback) to stop it.

If you elected to record your movie as an Animated GIF then your movie is broadcast back to the Server on completion and can be played using any movie player than supports Animated GIFs, including Microsoft Internet Explorer and FireFox.



## 8.6 International Patching System (IPS) Files

NES Cafe supports International Patching System Files (IPS). IPS files are used to patch (edit) the contents of the underlying Nintendo ROM files, allowing hackers to change the graphics or to change entire levels within games. It is also worth noting that NES Cafe does not permanently edit the underlying ROM file unlike other IPS tools. This means that you do not risk losing an original ROM by patching it using this IPS feature.

To allow the IPS file to be loaded in Applet mode you must ensure that it is specified by the IPSURL tag inside the HTML code (see the Applet Configuration section). The IPSURL tag must point directly at the file; you should not point this URL at a PHP script.

An example Applet Tag is below:

```
<applet code=NESCafeApplet
        archive=nescafe.jar
        codebase=.
        Width=260
        height=244
        name=nescafe>

        <param name=ROMFILE value=roms/megaman2.zip>
        <param name=IPSURL value=ips/megaman2.ips>

</applet>
```

To allow the IPS file to be loaded in Standard mode you must ensure that the file is placed into a subdirectory called IPS, directly below where you placed NES Cafe and that the file is called the same as the ROM image you are running, but with an .ips extension.

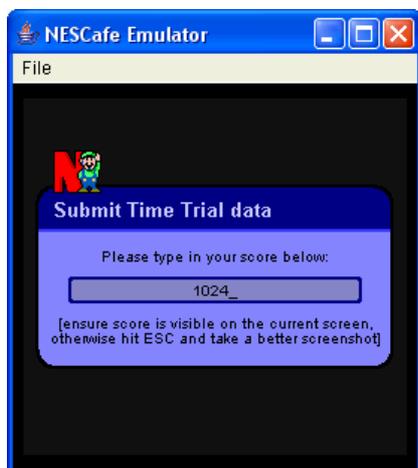
An example directory configuration is below:

```
/nescafe.jar
/roms/mario1.zip [The game that you are running]
/ips/mario1.ips [The IPS patch file that you want to load with mario1.zip]
```

Users should know that saving and loading State information is prevented when using IPS patched games in order to prevent corruption when a state saved with a particular IPS patch is later loaded into the same game, but without the IPS patch applied.



## 8.7 Time Trial Mode



Submitting your Score in Time Trial Mode

NES Cafe support Time Trial mode using the STARTTIMETRIAL flag in the Settings file. When NES Cafe starts up it will tell the user that they are running in Time Trial mode and to press ENTER to start the game.

During the game the user will be prevented from using any of the cheat modes (such as making changes to the Game Genie code configuration or using the Time Shift Buffer).

When the user wants to submit their score back to the website they can press the T key on their keyboard, type in their score and click submit. Their score is then submitted, along with an automatically generated screen shot (to validate the score that they typed in).

If NES Cafe is running from a Web Server, the data is posted back via the nescafesave.php script using the nescafe/timetrial content-type and is stored in the *timetrials* subdirectory.

NOTE: You cannot enable Time Trial mode at the same time as NES Cafe Overrides. This is because the Override Engine provides everything that the Time Trial mode provides, plus support for automatic broadcast of scores upon particular memory reads and writes. To learn about Overrides please see the Overrides section in this document.

When NES Cafe is run in Time Trial Mode from a Web Server, the Time Trial data is saved to the Web Server via the nescafesave.php script. You could change that script to intercept the values being sent back if you wanted to (these scripts are provided openly), or you could leave the script to just save the data to a flat file in the timetrials directory.

The following two variables are posted to the server via the nescafesave.php script:

*timetrialtext* This variable holds the text, or score, that the user typed in  
*timetrialtime* This variable holds the number of seconds the user played for

## 8.8 NES Cafe Override Engine and Code Profiler

This feature is unique to NES Cafe. Overrides are scripts that tell NES Cafe how to respond as the game runs. Overrides can be used to implement very powerful game logic. The Code Profiler is intended for the use of assisting with the creation of NES Cafe Overrides or disassembling Nintendo games. For more information please see the NES Cafe Overrides Guide document, which is available at [www.daviddn.com/nescafe](http://www.daviddn.com/nescafe)



## 9 Hardware Supported

The following list of hardware is emulated by NES Cafe:

- The n6502 Micro-processor
- The Nintendo Picture Processing Unit (PPU)
- 5 Sound Channels (2 Square, Triangle, Noise and DMC)
- NES Joy-pad and Light Gun

Additional supported features:

- Allows users to Save and Load the State of the NES
- Allows users to record their game-play for future playback
- Emulates and interprets Game Genie Codes
- Provides a built-in Nintendo 6502 Debugger
- Provides a built-in ROM Download Client
- Provides real-time support for IPS Patches for NES games
- Provides real-time image smoothing of NES games using Kreed's 2XsaI
- Provides a configurable Time Shift Buffer for jumping back in time.
- Provides support for Time Trials and Overrides (powerful Game Genie codes)
- Provides a 6502 code and memory Profiling Engine

The following Memory Management Controllers (MMC's) are supported:

001: Nintendo MMC1	065: Irem H-3001	119: TQ-ROM
002: PROM Switch (UNROM)	066: Bandai 74161/32	122: Sunsoft 74161/32
003: VROM Switch (CNROM)	067: Sunsoft Mapper 3	140: Mapper 140
004: Nintendo MMC3	068: Sunsoft Mapper 4	151: VS Unisystem (Konami)
005: Nintendo MMC5	070: 74161/32	180: Nichibutsu
006: Konami FFE F4xxx	071: Camerica Mapper	181: Hacker International Type 2
007: Rare AOROM	072: Jaleco Early Mapper 0	182: PC-SuperDonkeyKong
008: Konami FFE F3xxx	073: Konami VRC3	183: Gimmick (Bootleg)
009: Nintendo MMC2	075: Jaleco/Konami VRC1	184: Sunsoft 74161/32
010: Nintendo MMC4	076: Namco 109	185: CHR-ROM Disable Protect
011: Color Dreams	077: Irem Early Mapper 0	189: Street Fighter 2 Yoko
015: 100-in-1	078: Jaleco 74161/32	222: Mapper 222
017: Konami FFE F8xxx	079: Nina-3 (AVE)	225: 72-in-1
018: Jaleco SS8806	080: Taito X-005	226: 76-in-1
021: Konami VRC4 2 <sup>a</sup>	082: Taito C075	227: 1200-in-1
022: Konami VRC4 type 1B	086: Jaleco Early Mapper 2	228: Action 52
023: Konami VRC2 type B	087: Konami 74161/32	229: 31-in-1
032: Irem G-101	088: Namco 118	231: 20-in-1
033: Taito TC0190 TC0350	089: Sunsoft Early Mapper	232: Quattro Games
034: Nina-1	091: PC-HK-SF3	233: 42-in-1
040: SMB2J	092: Jaleco Early Mapper 1	236: 800-in-1
041: Caltron 6-in-1	093: Sunsoft 74161/32	240: Gen Ke Le Zhuan
046: Rumble Station	094: Capcom 74161/32	242: Wai Xing Zhan Shi
047: NES-QJ	097: Irem 74161/32	243: PC-Sachen/Hacker
048: Taito TC190V	099: VS Unisystem	244: Mapper 244
050: SMB2J	101: Jaleco 74161/32	245: Yong Zhe Dou E Long
057: 54-in-1	105: Nintendo World Championship	246: Phone Serm Berm
058: 68-in-1	113: PC-Sachen/Hacker	248: Bao Qing Tian
060: 65-in-1	117: PC-Future	251: Mapper 251
062: Mapper 62	118: IQS MMC3	255: 110-in-1
064: Tengen Rambo-1		



## 10 Problems with NES Cafe

NES Cafe is a constantly evolving product and as-such, it will have bugs and problems. However, many of the everyday issues experienced can usually be resolved quite easily. When you experience an error with NES Cafe please check the following table first to see if there is a reason, or a work-a-round, otherwise please report the issue to the author.

Symptom	Details
<p>When I run the NES Cafe Applet on my Web Server it displays the following error message on screen:</p>  <p>It doesn't happen locally when I run it from the HTML file or from the Java Applet Viewer, it only happens remotely from my Web Server.</p>	<p>When NES Cafe starts up on a website it will attempt to communicate with the NES Cafe server to ensure the latest version is running and that online options can be enabled.</p> <p>To allow NES Cafe to communicate with the NES Cafe website the following actions need to have been completed by who configured the website. If they haven't then users will get the error message shown on the left.</p> <ol style="list-style-type: none"><li>1. Install PHP onto your web server. PHP is freely available for UNIX, Linux, Mac OS and Microsoft Windows platforms. Most commercial websites already have PHP installed. If you are unsure please check with the Administrator for your website.</li><li>2. Copy the nescafeproxy.php file from Applet distribution into the same directory that you have installed the nescafe.jar file. This script is a proxy script that allows NES Cafe to talk to the NES Cafe Website at <a href="http://www.daviddn.com">www.daviddn.com</a></li><li>3. Ensure that no automatic adverts are being broadcast from the URL that the nescafeproxy.php script is being hosted from, as this will prevent NES Cafe from being able to read the URL correctly.</li><li>4. Ensure that you are not running NES Cafe from a domain that blocks the use of the fsockopen PHP command (which is used by the proxy script). This could happen if you are using Windows hosting provided by GoDaddy. The only option here is use GoDaddy Linux hosting, or change to another provider.</li></ol>



Symptom	Details
<p>When I attempt to save a NES Cafe State file in the Applet version I receive a message saying that the State File failed to load/save</p>  <p>It doesn't happen locally when I run it from the HTML file or from the Java Applet Viewer, it only happens remotely from my Web Server.</p>	<p>This issue is caused by one of the following:</p> <ol style="list-style-type: none"> <li>1. You are running a version of NES Cafe prior to 0.706, please ensure you update to the latest version which has a fix for a potential cause of this issue.</li> <li>2. You have not installed PHP on your web server. If you are using a hosting company for your web site you should get in touch with them and confirm that PHP has been correctly installed. If you are running your own web server then you should install PHP yourself.</li> <li>3. You have not correctly specified the LOADDATAURL and SAVEDATAURL parameters in the Applet tag (or Object tag if you are using that approach). The scripts must point at the location of where you placed the nescafe-load.php and nescafe-save.php respectively on your web server.</li> <li>4. You are using a web site hosting company (such as Windows hosting by GoDaddy) that prevents PHP scripts from being allowed to write to the web server. If this is the case then you should consider using another, equally-secure, web hosting companies that don't have this restriction in place.</li> </ol>
<p>When I run the NES Cafe Applet on my Web Server it displays a white screen with a red cross in the top left-hand corner.</p>	<p>This issue is caused by either not having Java installed on your computer, or by having a corrupted version of NES Cafe. First make sure that you have installed Java (there should be a Java icon in your Control Panel if using Microsoft Windows). You can download the Java plugin from sun.java.com Secondly, make sure that you transferred the nescafe.jar file from your PC to the web server using Binary mode, as otherwise the file will be corrupted. Please consult the instructions for your FTP client for assistance.</p>



Symptom	Details
When I run the NES Cafe Applet on my Web Server it displays a black screen, but no game runs.	This issue can be caused when the user has more than one version of Java installed on their computer and the Applet Tag is not associated with the right (or most recent version). To fix this problem please either use the OBJECT tag (rather than the APPLETTAG) in your HTML pages, or go to the Java Control Panel (within Windows Control Panel), click on Advanced, expand the menu item called "<APPLET> tag support" and ensure that your web browser is ticked.
NES Cafe fails to load a State file using the LOADSTATEONSTARTUP Applet Tag when it starts up.	This could be caused by your Web Server not having certain MIME types registered. For example, NES Cafe State filenames typically end with .NSS (NES Cafe Save State). If your Web Server does not have this MIME type registered then NES Cafe will not be able to load states directly. To fix this problem you should consult the documentation for your Web Server, or your Web Hosting provider.



## 11 Credits and Thanks

### For their Documentation

Brad Taylor (sound)  
Brice Fines (sprite priorities)  
Darren Ranalli (NEStor)  
Firebug (memory Mappers)  
Freddy Offenga (undocumented opcodes)  
Jeremy Chadwick  
Loopy (scrolling)  
Marat Fayzullin  
Matt Conte

### For their involvement

Daniel Fisher [everyvideogame.com]  
Jeremy Chadwick  
John Steiner  
Jonathan Hudghton [emu.me.uk]  
Niamhy Fitz  
Rob Gonzalez  
SmashManiac  
Thea Chell  
Tyler Gibson  
Zheng Zhu



## 12 NES Cafe History

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### NES Cafe 0.706 (February 2007)

- Fixed bug where Save States were not working for indirect URLs in Applet Tags
  - General maintenance improvements and updates to documentation
- 

### NES Cafe 0.705 (September 2006)

- Maintenance release, incorporating improvements to remote debugging and updates to documentation
  - Now forces Applet installations to have a nescafe.settings file at start-up
- 

### NES Cafe 0.704 (August 2006)

- Added Online Activity Monitor to allow users to view other games being played in real-time from other sites
  - Added DisableActivityMonitor tag to the NES Cafe settings file to prevent the Activity Monitor from being used
  - Added StartActivityMonitor tag to the NES Cafe settings file to cause it to start when NES Cafe starts
  - Changed APPLETTAGS in the distributions to be OBJECT tags for better compatibility (docs changed also)
  - Added ScreenSizeFactor factor to the NES Cafe settings file
- 

### NES Cafe 0.703 (July 2006)

- Fixed bug with Overrides not firing when users specify addresses in lowercase hex format
  - Fixed bug where screen was greying out when entering Game Genie codes using the user interface
  - Fixed bug where forcing of Animated GIF recording mode wasn't working
  - Fixed bug where DisableSaveState was preventing Trigger Saves
  - Fixed bug where write count didn't increment for all operations in debug mode
  - Added TRIGGER DELAY option to Overrides
  - Added DisableReset flag to NES Cafe settings file
  - Added graphics option to clip screen left and right and added settings entry CLIPBOARDERS=true
  - Added graphics option to horizontally flip the screen (just a bit of fun, makes games interesting to play)
  - Added Debug output for Keypresses
  - Made speed improvements to the NES Cafe Override Engine
- 

### NES Cafe 0.702 (June 2006)

- Provided support for Encrypted NES Cafe ROMs (see [www.daviddn.com/nescafe/tools.asp](http://www.daviddn.com/nescafe/tools.asp))
  - Added nescafeproxy and nescafeinfo.php as options for those sites that don't allow 'proxy' in filename
  - Fixed issues where NES Cafe would sometimes hang when opening a game if another was already running
- 

### NES Cafe 0.701 (June 2006)

- Added Profiler to NES Cafe, press F6 to profile memory and extract decompiled NES code
  - Fixed issue with NES Cafe Overrides so that VALUE keyword is rejected in ON READ|KEYPRESS keywords
  - Fixed issue where F8 was not allowing users to stop a Movie recording (F7 was incorrectly mapped)
  - Added OverRideActiveAtStartup flag to settings file to force Overrides to activate on start-up (default TRUE)
  - Added ability to enable and disable the Overrides from the Extra's menu.
  - Improved Menu handling and further GUI updates
-



### NES Cafe 0.700 (June 2006)

- Added NES Cafe Override Engine to allow websites to run custom versions of games (like Punch-out Online)
  - Fixed problem where NES Cafe API Functions were not available to some websites
  - Added TimeTrialTime variable, which is now posted at the end of a Time Trial and contains the play time
  - Added support for URL redirects from the nescafesave.php script to allow websites to redirect NES Cafe
  - Made internal improvements to how NES Cafe handles its menu system, now implements a Stack
  - Several improvements to the GUI and more efficient memory handling
  - Fixed bug where some games would hang when opened in Standalone mode, but not Applet mode
- 

### NES Cafe 0.617 (May 2006)

- ROLLBACK: Some speed updates made during 0.616 were rolled back because of compatibility issues
  - Major compatibility issues resolved with the previous version of NES Cafe, please update to this version
  - Added Time Trial Mode to NES Cafe Applet and Standalone editions for Game Competitions
  - Moved DisableDebug tag from APPLLET tag into the NES Cafe Settings File for consistency
  - Moved DisableDownloading tag from APPLLET tag into the NES Cafe Settings File for consistency
  - Moved DisableFrameSkiptag from APPLLET tag into the NES Cafe Settings File for consistency
  - Moved StartDownloader tag from APPLLET tag into the NES Cafe Settings File for consistency
  - Moved DisableSaveRAM, DisableSaveState, DisableSaveImage and DisableSaveMovie to the Settings File
  - Moved DisableTimeShiftBuffer tag from APPLLET tag into the NES Cafe Settings File for consistency
  - NES Cafe Settings file is now able to be loaded via Script interface across HTTP
  - Added DisableGameGenieChanges option to the NES Cafe Settings file
  - Added MovieMode option to the NES Cafe Settings file to force a Movie Recording mode
  - Added DisableMenu option to the NES Cafe Settings file to prevent the Menu system being used
  - Added MovieFormat option to the NES Cafe Settings file to set the default Movie Recording mode
  - FPS value is posted to the nescafeproxy.php script (see example of fetching this in new nescafesave.php)
  - GUI improvements to NES Cafe Applet and NES Cafe Standalone
- 

### NES Cafe 0.616 (May 2006)

- Major speed improvements to CPU, Memory Manager and Sound Engine, thanks to Zheng Zhu
  - More accurate (non-thread-based) frame per second analysis
  - Fixed bug where sound was not muting in Debug Mode
  - Warns user when Zapper is used in Keystroke-recorded Movies
  - Attempts to fetch the real name of the Game from the NES Cafe server when you play it in Applet Mode
- 

### NES Cafe 0.615 (April 2006)

- Fixed issue where NES Cafe now checks if the Web Server has unsupported 404 error code page enabled.
  - Introduced a NES Cafe JavaScript API to allow websites to load games mid-flight from the hosting webpages
  - Lowered the Sound Specification to 22,050 mono
  - Fixed bug with BattleToads crashing
  - Fixed bug with NULL Pointer when closing down ROM file and opening it up immediately afterwards
  - NES Cafe Applet Expiration date pushed back to December 2006
  - Support for 404 Custom Web Servers
  - Added MOVIE MAXSIZE tag to limit size of Animated GIF files (disable animated GIF if less than 1K)
  - Screenshot and Time Shift Buffer format support both GIF and PNG formats
  - Added IMAGEFORMAT tag to nescafe.settings file to support both GIF and PNG image capture
  - Download NES Cafe link in Standard version now takes Windows users to Website
  - Pressing F8 will first bring up screen allowing user to select Movie Capture Style
  - Added support to the nescafeshowthumb.php script for PNG and GIF files embedded in State Files
-



### NES Cafe 0.614 (November 2005)

- Added the option to Save Animations as Animated GIF Files in the Applet and Standard versions
  - Added a Configuration Menu Screen for the Animated GIF Recording (for FPS and Resolution)
  - Added nescafeload.php and nescafesave.php scripts, which replace all previous PHP load scripts
  - Fixed bug where NES files would not load in Applet mode from a Web Browser and needed to be zipped
  - Added Broadcast Menu Screen to show data being prepared and broadcasted to server
  - Changed the function of LOADSTATEONSTARTUP tag to point at a NSS file, rather than being a Boolean
  - Added functionality to cause the NSS file specified by LOADSTATEONSTARTUP to be loaded on Resets
- 

### NES Cafe 0.613 (October 2005)

- Added a configurable Time Shift Buffer to allow players to jump back in time (press ESC)
  - Added TIMESHIFTBUFFERINTERVAL and TIMESHIFTBUFFERLENGTH settings file tags.
  - Added settings menu screen to allow players to configure the Time Shift Buffer.
  - Added Thumbnail images to the SaveRAM files (picture taken at Save time).
  - Only load Thumbnail images in Load and Save State screens after 1 second delay.
  - Added Graphics menu option to allow hiding or showing of the Background layer.
  - Changed showthumb.php so that it also works with the SaveRAM thumbnails
  - Increased the Movie Recording time to 100,000 key-presses (over 24 hours of recording)
  - Added HIGHRESTHUMBNAILS option to Settings file to improve quality of Thumbnails.
  - Added No-Stretch option to the Graphics Menu (to prevent scaling)
  - Added ability to save Movies into any available save slot
  - Increased the number of available Save Slots to 20.
  - GUI improvements to Save State, Load State and Download ROM screens.
  - Fixed bug where Applet screen would glitch when it loses focus on the Web Page
  - Added option to stop playback of long Movies by pressing the F8 key.
- 

### NES Cafe 0.612 (21 August 2005)

- Added support for GZIP compressed State Files and a PHP script to view Thumbnails.
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### NES Cafe 0.611 (20 August 2005)

- Added 2xSaI algorithm to filter images and improve quality of display (requires fast PC)
  - More improvements to the GUI, and included a Graphics Options menu
  - Increased the quality of the Thumbnail images in the Save State files to 100x100 pixels.
  - Added support for International Patching System (IPS) files and new IPSURL Applet Tag.
  - Fixed how resources are loaded from JAR files in the Standard distribution
  - Fixed Cursor display in Applet Mode
  - Added Debug Mode to the Setting file (to assist website developers using NES Cafe)
- 

### NES Cafe 0.610 (16 August 2005)

- Major GUI Improvements, also added Mouse Support for easier navigation
  - Fixed issues where some machines don't respond during Sound Processing.
  - Fixed bug where movie playback allowed key-presses.
  - Fixed bug with Game Genie codes being incorrectly interrupted for MMC games.
  - Fixed bug where Applet screen goes partially blank or does not appear.
  - Fixed Sound Issues when starting without a Security Manager
  - Added NES Cafe About Screen (press I to display)
  - Added support for Mapper 118 (IQS MMC3)
  - Fixed PPU Banking (PPU Banks now Wrap Around Correctly avoiding distortion)
-



### NES Cafe 0.600 (20 June 2005)

- New Menu System (improved and common across Applet and Standalone versions)
  - Intermittent Rendering Engine Exception when GIF images are loaded removed
  - ROM List Download Can be Against Dynamic Content, not just fixed-length
  - Applet can now Download ROMs from Server when Applet hosted on ROM Server
  - Compiled with -source 1.2 target 1.1 on Java 1.5, compatible with new versions of Java
  - Fixed bug with Emulation Speed Message staying up for 5000 seconds instead of 5
  - Muted Distributions available for both Applet and Standalone for slower computers.
- 

### NES Cafe 0.590 (6 June 2005)

- Support for recording and playing back Movie recordings of Games
  - Game Genie Applet Tag GAMEGENIE has been added
  - Added Game Subtitles (currently only Punch-Out has is enabled, but more to come)
  - Display the 64 Sprite Tiles by hitting F9 (disabled Sprites appear greyed out).
  - Change emulation speed by hitting F11 (to decrease) or F12 (to increase)
  - Save States file is tagged format and has embedded screenshot (backwards compatible).
  - Improved the Load State menu so that users can browse the screenshots in the States.
  - Improved the Debug Engine (press F5 to enter Debug Mode)
  - Added DISABLEDEBUG Applet Tag to prevent Debugger being used for certain games.
  - 4 CPU Cycles between start of Vertical Blank and NMI Interrupt
  - Zero Page Y wraps correctly (Cheers Blue Hawk)
  - Indirect X and Indirect Y wraps correctly (Cheers Blue Hawk)
  - ADC and SBC Overflow Flag logic has been corrected (Cheers Blue Hawk)
  - Reserved Bit is set for PHP instruction (Cheers Blue Hawk)
  - Fixed NMI and IRQ by setting the Reserved Bit
  - Reset Sound Hardware on Game Load
  - Sprite limit set when 8 or more sprites encountered on scan-line, instead of more than 8.
- 

### NES Cafe 0.580 (14 March 2005)

- Press ESC to change the controls for the Joypad
  - Multiple Load and Save States supported by Applet and Standalone versions.
  - Support for Game Genie Codes in Applet version, press G to bring up the menu.
- 

### NES Cafe 0.570 (25 February 2005)

- Improve Sound processing and better support for DMC
  - Applet Mode can now use C and L to commit and load States via CGI scripts
  - Fixed bug where GUI screen was not blanking when ROM images were closed.
  - Images saved to PNG format instead (press A in both Standalone or Applet version)
  - Press I to show Cartridge ROM information in both Standalone and Applet version
  - Press Q to clear Save RAM and reset the Cartridge in both Standalone and Applet version
  - New Applet tag LOADSTATEONSTARTUP for forcing State to load on start-up
  - Percentage Bar loading screen has been added
  - Applet version can now load ROMs with extension .zip.php and .zip.asp
  - Added Applet tag DISABLEFRAMESKIP for forcing no frame skipping
  - Added Applet tag SETTINGSFILE for loading the setting files from alternative location
  - Sound channel information is now included in Save State files
  - When Light-gun (Zapper) is plugged in a Cross-Hair appears for firing.
  - Settings file can be used to store Controls in both Standalone and Applet versions
  - Press < and > to swap between controlling Player 1 and Player 2
  - Special thanks to Daniel Fisher from www.everyvideogame.com for his help.
-



### NES Cafe 0.560

- V flag in P register not be set correctly on addition and subtraction (cheers Qian Wenjie)
  - JMP (\$AAAA) not correctly implemented and fixed (cheers Qian Wenjie)
  - Improved GUI, more consistent between Applet and Standalone versions.
  - Sound toggle bug fixed when pressing S in standalone didn't enable channel selection.
  - Microsoft JVM 5.0 works in Applet Mode now
- 

### NES Cafe 0.550

- 77 new Mappers supported (including fixes to existing Mappers)
  - Better Implementation of handling UP+DOWN or LEFT+RIGHT (SmashManiac)
  - Embedded NES Cafe ROM into the main distribution
  - Game Images are stored as DDNB files, which will provide metadata for their content
  - Fix to PPU: No longer reset PPU address mode during Vertical Blank.
  - Fix to PPU: Reading from VRAM in ppuRead correctly mirrors the Palette memory.
  - Remove Processor Interface (speed up)
  - Added code to correct incorrectly dumped ROM images (partial implementation).
  - Added code to change clock cycles for specific games (such as Battle Toads and SMB3).
  - Larger screen sizes are now supported in Applet mode.
- 

### NES Cafe 0.540

- DMC Sound Support
  - Applet now reads GIF files from within JAR file
  - Can now Load a Saved State from Applet Mode
  - Improvements to the SoundInterface (a bit smoother)
  - Fixed bug with JoyPad – UP+DOWN or LEFT+RIGHT were not cancelling (SmashManiac)
  - Fixed bug in N6502 where Inactive Display was sleeping for 200ms (SmashManiac)
- 

### NES Cafe 0.530

- Applet is now compiled with 1.1 Class Structure so works with Microsoft JVM Plugin.
  - NES Cafe Client now works with Corporate Firewalls and Proxy Servers.
- 

### NES Cafe 0.520

- Fixed major bug with PPU clearing Sprite0 Hit on Reg 2002 Read.
  - Added an inbuilt debugging engine (press F5 to enter).
  - Added ROM Download Engine (download ROMs directly from Internet into NES Cafe).
  - NES Cafe display is now resizable (need fast machine!).
  - Support for GZIP and ZIP compressed files.
  - Support for the Nintendo Zapper (Light Gun) added.
  - GUI improvements and Checkbox Menu Items.
  - Battery Backed Memory fully implemented – Save RAM.
  - Dropped CPU Cycles per scan line down to 116
  - Colour Emphasis working in PPU register 2001
  - Fixed bug with PPU where rendering was not happening if Screen was Off.
  - Fixed Sprite 0 Collision Detection, which works inline with Damian Yerrick's Test.
  - Fixed Nintendo MMC1 and MMC3.
  - Added Mapper Konami FFE F4xxx, FFE F3xxx and Mapper Color Dreams
  - Added Mapper 100-in-1 and 1200-in-1
  - Wrote and provided NES Cafe ROM Image (Demo NES ROM)
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### NES Cafe 0.500

- Applet Mode has been re-introduced and improved.
  - The GUI has had some internal improvements.
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### NES Cafe 0.430

- Debug Mode has been removed from N6502 processor.
  - Undocumented Operation Code Processing now an option. (Jeremy Chadwick suggested)
  - MMC2 Mapper now perfect – will run Mike Tyson's and Mr Dream's Punch-out without glitches.
  - Removed NET and Applet support because it wasn't working correctly.
  - Picture Processing Unit now perfect – better support for all games.
- 

### NES Cafe 0.420

- Incorrect addressing mode used with RRA \$AAAA,Y instruction. (Rob Gonzalez)
  - SAX instruction doesn't set the Carry bit. (Rob Gonzalez)
  - LSR instruction is not clearing the SIGN bit. (Rob Gonzalez)
  - LoadSaveRam method causes problems when run as Applet. (Tyler Gibson)
-